



## **Methane mapping and its seasonal cycle in the atmosphere of Western Siberia as observed by IASI**

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Western Siberia is wide area covered with pristine peatlands which play important role in global carbon balance. Large areas of arctic and subarctic wetlands are vulnerable to climate change and industrial activity on oil, natural gas mining together with their transportation. These areas can have important feedback mechanisms in global warming, due to their large carbon stocks and the presence of permafrost.

This study presents iterative regularization methods, software tool and some results on CH<sub>4</sub> content retrieval from Infrared Atmospheric Sounding Interferometer (IASI/MetOp series) spectra measured over Western Siberia. Dense coverage of IASI measurements can be used to map sink and source regions on the territory of target region. Because of pure statistics of direct vertical profile measurements and low signal to noise ratio for northern part of target region, only most stable methods of methane content retrieval are required. We used iteratively regularized Gauss-Newton and Levenberg-Marquardt methods without using a priori covariance matrices for methane vertical profiles. Some examples of iteratively calculated averaging kernels for both methods are represented.

Spatial distribution methane columnar value maps, seasonal variations for whole target region are represented. Comparison of ground-based FTIR measurements of methane in atmosphere with obtained IASI-CH<sub>4</sub> over Kourovka site is presented. Comparison of GOSAT standard products for methane and our retrieval results are presented and discussed.